CLAIMS

What is claimed is:

1. An ultrasonic test apparatus for polymeric materials comprising a low-absorption housing at least partially enclosing an ultrasound transducer that emits a low frequency wide angle ultrasound beam having a narrow bandwidth.

2. The apparatus of claim 1 wherein the low-absorption housing comprises high-impact polystyrene.

3. The apparatus of claim 1 wherein the low frequency is between about 1 MHz and about 5 MHz.

4. The apparatus of claim 1 wherein the ultrasound beam is emitted at a beam angle of between about 30 degrees and about 80 degrees, and most preferably of between about 40 and about 70 degrees.

5. The apparatus of claim 1 wherein the bandwidth is about ±10% of the low frequency.

6. The apparatus of claim 1 wherein the housing comprises high-impact polystyrene, and wherein the low frequency is about 2.25 MHz at a bandwidth of about ± 10%.

7. The apparatus of claim 6 wherein the ultrasound beam is emitted at a probe angle between about 30 and about 80 degrees, .

8. The apparatus of claim 1 wherein the polymeric material comprises a high impact resistant polystyrene.

9. The apparatus of claim 8 wherein the polymeric material is selected from the group consisting of high-density polyethylene, polypropylene, and polyvinylidene fluoride.

10. The apparatus of claim 1 further comprising an ultrasound receiver in pitch-catch arrangement with the transducer, wherein the ultrasound receiver produces a signal.

11. The apparatus of claim 10 wherein the signal is processed using a signal processing software that translates the signal into a visual output.

12. The apparatus of claim 11 wherein the visual output is displayed on a portable device that is electronically coupled to at least one of the transducer and ultrasound receiver.

11. A method of marketing an ultrasound test apparatus, comprising:

providing an apparatus that has a low-absorption housing at least partially enclosing an ultrasound transducer, wherein the transducer emits a low frequency wide angle ultrasound beam having a narrow bandwidth; and

providing information that the apparatus is useful in detection of a flaw in a polymeric material.

12. The method of claim 11 wherein the housing is fabricated at least in part from high-impact polystyrene, and wherein the low frequency is between about 1 MHz and about 5 MHz.

13. The method of claim 12 wherein the ultrasound beam is emitted at a beam angle of between about 40 degrees and about 70 degrees, and wherein the bandwidth is about ±10% of the low frequency.

14. The method of claim 13 wherein the ultrasound beam is emitted at a probe angle of about 60 degrees.

15. The method of claim 14 wherein the polymeric material is selected from the group consisting of high-density polyethylene, polypropylene, and polyvinylidene fluoride.

16. The method of claim 11 wherein the flaw is selected from the group consisting of an inclusion, porosity, a lack of fusion, and a fracture.

17. The method of claim 16 wherein the information further includes advice that the lack of fusion is detected by a loss of at least one of a back wall echo and a lateral wave.

18. The method of claim 11 wherein the information further includes advice that the apparatus will detect the flaw in the polymeric material, when the polymeric material has a thickness of up to 4 inches.

19. The method of claim 18 wherein the flaw has a size of less than 4% of the thickness of the polymeric material.

20. The method of claim 19 wherein the polymeric material comprises a butt weld of two pipes.